

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

**Claim 1 (currently amended):** A process for forming a multilayer three-dimensional structure, comprising:

(a) forming and adhering a layer, comprising a plurality of materials, to a previously formed layer or to a substrate;

(b) repeating the forming and adhering ~~operation of (a)~~ at least once a ~~plurality of times~~ to build up a three-dimensional structure from a plurality of adhered layers;

wherein the ~~formation~~ forming of at least one of the a-plurality of adhered layers, comprises:

(1) obtaining a selective pattern of deposition of a first material having at least one voids, comprising at least one of:

(a) selectively depositing a first material onto a substrate or previously formed layer such that at least one voids remains; or

(b) depositing a first material onto a substrate or previously formed layer and selectively etching the deposit of the first material to form at least one voids therein; and

(2) depositing a second material into the at least one voids via a thermal spraying process.

**Claim 2 (currently amended):** The process of claim 1 ~~wherein the formation of the plurality of layers additionally comprises~~ comprising performing at least one planarization operation during ~~on the forming of~~ each of at least a portion of the plurality of adhered layers.

**Claim 3 (original):** The process of claim 1 wherein the thermal spraying process comprises at least one of: (1) an arc wire spraying process, (2) a high velocity oxygen-fuel (HVOF) spraying process, (3) a plasma spraying process, (4) a plasma transferred

arc (PTA) spraying process, (5) a vacuum or low pressure plasma spraying process, (6) a low velocity oxygen-fuel (LVOF) spraying process, (7) a detonation thermal spraying process, (8) a high velocity particle consolidation (HVPC) spraying process, (9) a wire spraying process, or (10) an ion plating process.

**Claim 4 (currently amended):** The process of claim 1 wherein the after depositing via a thermal spraying process, during the forming of at least one layer, results in a porous deposit of the second material and thereafter infiltrating a third material into at least a portion of the pores in the second material~~an infiltration process is used to fill any surface voids with a third material.~~

**Claim 5 (currently amended):** The process of claim 1 wherein after depositing via a thermal spraying process, during the forming of at least one layer, performing at least one subsequent operation so that at least one of: (i) is used wherein modification of the second material occurs, or (ii) enhanced wherein adhesion between the second material deposited in association with the at least one layer and material deposited in association with another layer is enhanced occurs.

**Claim 6 (currently amended):** A process for forming a multilayer three-dimensional structure, comprising:

(a) forming and adhering a layer, comprising a plurality of materials, to a previously formed layer or to a substrate;

(b) repeating the forming and adhering ~~operation of (a)~~ at least once a plurality of times to build up a three-dimensional structure from a plurality of adhered layers;

wherein the ~~formation~~ forming of at least one of the at least a plurality of adhered layers, comprises:

(1) obtaining a selective pattern of deposition of a first material having at least one voids, comprising at least one of:

(a) selectively depositing a first material onto a substrate or previously formed layer such that at least one voids remains; or

- (b) depositing a first material onto a substrate or previously formed layer and selectively etching the deposit of the first material to form at least one voids therein; and
- (2) depositing a second material into the at least one voids;
- (3) etching the deposited ~~of the~~ first material or second material to form at least one second voids; and
- (4) depositing a third material into the at least one second voids via a thermal spraying process.

**Claim 7 (currently amended):** The process of claim 6 wherein ~~the formation~~ forming of at least a portion of the plurality of adhered layers additionally comprises performance of at least two planarizations operations during forming of each layer on each of at least a portion of the plurality of adhered layers.

**Claim 8 (currently amended):** The process of claim 6 wherein the ~~formation~~ forming of at least a portion of the plurality of adhered layers additionally comprises performance of at least one planarization operation on during forming of each layer of at least a portion of the plurality of adhered layers.

**Claim 9 (original):** The process of claim 6 wherein the thermal spraying process comprises at least one of: (1) an arc wire spraying process, (2) a high velocity oxygen-fuel (HVOF) spraying process, (3) a plasma spraying process, (4) a plasma transferred arc (PTA) spraying process, (5) a vacuum or low pressure plasma spraying process, (6) a low velocity oxygen-fuel (LVOF) spraying process, (7) a detonation thermal spraying process, (8) a high velocity particle consolidation (HVPC) spraying process, (9) a wire spraying process, or (10) an ion plating process.

**Claim 10 (currently amended):** The process of claim 6 wherein ~~after the~~ depositing via a thermal spraying process, during the forming of at least one layer, results in a porous deposit of the third material and thereafter infiltrating a fourth

material into at least a portion of the pores in the third material~~an infiltration process is used to fill any surface voids with a fourth material.~~

**Claim 11 (currently amended):** The process of claim 6 wherein after depositing via a thermal spraying process during the forming of at least one layer, performing at least one subsequent operation so that at least one of: (i) is used wherein modification of the third material occurs, or (ii) wherein adhesion between the third material deposited in association with the at least one layer and material deposited in association with another layer is enhanced.

**Claim 12 (currently amended):** A process for forming a multilayer three-dimensional structure, comprising:

(a) forming and adhering a layer, comprising a plurality of materials, to a previously formed layer or to a substrate;

(b) repeating the forming and adhering operation of (a) at least once a plurality of times to build up a three-dimensional structure from a plurality of adhered layers;

wherein the ~~formation~~ forming of at least one of the a plurality of adhered layers, comprises:

(1) obtaining a selective pattern of deposition of a first material having at least one voids, comprising at least one of:

(a) selectively depositing a first material onto a substrate or previously formed layer such that at least one voids remains; or

(b) depositing a first material onto a substrate or previously formed layer and selectively etching the deposit of the first material to form at least one voids therein; and

(2) depositing a second material into the at least one voids wherein the second material prior to deposition comprises a powder.

**Claim 13 (currently amended):** The process of claim 12 ~~wherein the formation of the plurality of layers additionally comprises~~ comprising performing at least one

planarization operation during on the forming of each of at least a portion of the plurality of layers.

**Claim 14 (currently amended):** The process of claim 12 wherein the material comprising the powder, ~~further comprises~~ consists of at least one of (1) at least two powders of different materials, (2) at least two powders with different particle size distributions, (3) a liquid carrier for the powder, (4) a transformable binder that can be used to bind the powder particles, or (5) a liquid carrier that can be transformed by radiation, heat, pressure, or chemical means to bind the powder particles.

**Claim 15 (currently amended):** The process of claim 12 wherein the second material is porous and after depositing the second material powder an infiltration process is used to fill pores in the second material ~~any surface voids~~ with a third material.

**Claim 16 (currently amended):** The process of claim 12 wherein after depositing the powder, during the forming of at least one layer, performing at least one subsequent operation so that at least one of: (i) is used wherein modification of the second material occurs, or (ii) enhanced wherein adhesion between the second material deposited in association with the at least one layer and material deposited in association with another layer ~~is enhanced~~ occurs.

**Claim 17 (currently amended):** A process for forming a multilayer three-dimensional structure, comprising:

(a) forming and adhering a layer, comprising a plurality of materials, to a previously formed layer or to a substrate;

(b) repeating the forming and adhering ~~operation of (a)~~ at least once a ~~plurality of times~~ to build up a three-dimensional structure from a plurality of adhered layers;

wherein the ~~formation~~ forming of at least one of the a plurality of adhered layers, comprise:

- (1) obtaining a selective pattern of deposition of a first material having at least one voids, comprising at least one of:
  - (a) selectively depositing a first material onto a substrate or previously formed layer such that at least one voids remains; or
  - (b) depositing a first material onto a substrate or previously formed layer and selectively etching the deposit of the first material to form at least one voids therein; and
- (2) depositing a second material into the at least one voids;
- (3) etching the deposited ~~of the~~ first material or second material to form at least one second voids; and
- (4) depositing a third material into the at least one second voids, wherein the third material prior to deposition comprises a powder.

**Claim 18 (currently amended):** The process of claim 6 wherein ~~the formation~~ forming of at least a portion of the plurality of adhered layers additionally comprises performing of at least two planarizations operations during forming of each layer of the portion on each of at least a portion of the plurality of adhered layers.

**Claim 19 (currently amended):** The process of claim 17 wherein ~~the formation~~ forming of at least a portion of the plurality of adhered layers additionally comprises performing of at least one planarization operation on during forming of each layer of at least a the portion of the plurality of adhered layers.

**Claim 20 (currently amended):** The process of claim 17 wherein the third material ~~comprising the powder, further comprises~~ consists of at least one of (1) at least two powders of different materials, (2) at least two powders with different particle size distributions, (3) a liquid carrier for the powder, (4) a transformable binder that can be used to bind the powder particles, or (5) a liquid carrier that can be transformed by radiation, heat, pressure, or chemical means to bind the powder particles.

**Claim 21 (currently amended):** The process of claim 17 wherein the third material is porous and after depositing the third material powder an infiltration process is used to fill pores in the third material ~~any surface voids~~ with a ~~third~~ fourth material.

**Claim 22 (currently amended):** The process of claim 17 wherein after depositing the ~~powder~~ third material, during the forming of at least one layer, performing at least one subsequent operation so that at least one of (i) ~~is used wherein~~ modification of the ~~second~~ third material occurs, or (ii) ~~wherein~~ adhesion between the third ~~second~~ material deposited in association with the at least one layer and material deposited in association with another layer is enhanced.

**Claim 23 (new):** The process of claim 1 wherein the forming of at least one of the plurality of adhered layers comprises forming of at least two layers of the plurality of adhered layers.

**Claim 24 (new):** The process of claim 6 wherein the forming of at least one of the plurality of adhered layers comprises forming of at least two layers of the plurality of adhered layers.

**Claim 25 (new):** The process of claim 12 wherein the forming of at least one of the plurality of adhered layers comprises forming of at least two layers of the plurality of adhered layers.

**Claim 26 (new):** The process of claim 17 wherein the forming of at least one of the plurality of adhered layers comprises forming of at least two layers of the plurality of adhered layers.

**Claim 27 (new):** A process for forming a multilayer three-dimensional structure, comprising:

(a) forming and adhering a layer, comprising a plurality of materials, to a previously formed layer or to a substrate, wherein at least one of the plurality of

materials comprises at least one of (i) a material deposited via a thermal spraying process or (ii) a powder material prior to deposition;

(b) repeating the forming and adhering of (a) at least once to build up a three-dimensional structure from a plurality of adhered layers;

wherein the forming of one or more of the plurality of adhered layers, comprises:

(1) obtaining a selective pattern of deposition of a first material having at least one void, comprising at least one of:

(a) selectively depositing a first material onto a substrate or previously formed layer such that at least one void remains; or

(b) depositing a first material onto a substrate or previously formed layer and selectively etching the deposit of the first material to form at least one void therein; and

(2) depositing a second material into the at least one void.

**Claim 28 (new):** The process of claim 27 wherein the forming of at least one of the plurality of adhered layers comprises forming of at least two layers of the plurality of adhered layers.